

# PATENT SPECIFICATION



Application Date: May 24, 1923. No. 13,778/23.

225,251

" " Sept. 5, 1923. No. 22,883/23.

One Complete Left: Feb. 25, 1924.

Complete Accepted: Nov. 24, 1924.

## PROVISIONAL SPECIFICATION

No. 13,778, A.D. 1923.

### Improvements in or relating to the Manufacture of Composite Sheet Material.

I, CHARLES RICHARD COLLYER, of 423, Fulham Road, Chelsea, in the County of London, a British subject, do hereby declare the nature of this invention to be as follows:—

This invention relates to the manufacture of composite sheet material and it has for its object to produce, in a quick and economical manner, composite sheet material of a waterproof character and sound; shock and vibration absorbing nature and suitable for use as a covering material for various purposes including the covering of the interior walls of houses and particularly damp walls.

For this purpose composite sheet material of the character referred to comprises, according to the present invention, a layer of waterproof material, as for instance vulcanizable rubber, or rubber compositions, or rubber substitutes, with or without addition of vegetable, animal or mineral fibrous material (all hereinafter included for brevity in the term rubber) faced on one or each side with a layer of wood firmly united with the layer of rubber.

The layers of rubber and wood can be of various thickness and degrees of rigidity to suit requirement. For many purposes the thickness and degree of rigidity of the layers of rubber and wood may advantageously be such that the resulting composite sheet material is of flexible nature so that it can readily be bent to enable it to be applied to the curved or angular surfaces of different bodies. In this case the composite sheet material may advantageously consist of a thin layer of rubber and a thin layer of wood or veneer applied to one or to each surface of the layer of rubber, the com-

posite material in the latter case forming three-ply flexible material.

When composite sheet material of a more rigid nature is required, the layer of rubber may be thicker, or the layer or layers of wood, particularly the layer of wood that is to form the backing of the composite material, may be made sufficiently thick to impart the desired rigidity to the composite material. Or the layers of rubber and wood may each be made sufficiently thick to suit requirement. Or sheet material of a more rigid character, for instance perforated sheet metal, metal gauze or wire, may be embodied in the composite sheet material. For some purposes, the composite sheet material may consist of two or more layers of rubber with interposed and outer layers of wood to suit.

When a mixture of rubber and fibrous material is used to form what is herein called the layer or layers of rubber, the fibrous material may advantageously be kapok. Such composite material may advantageously be made in the manner described in the Specification of my Application for Letters Patent No. 196,095 and be combined with the layer or layers of wood as hereinbefore described.

The layer of rubber may in some cases have a backing of paper or papier mâché which may be backed by layers of rubber and wood, the paper or papier mâché in the latter case forming a centering.

In some cases the layer of rubber may consist of a coating of a vulcanizable solution of rubber applied to one side of the layer or each layer of wood or paper or papier mâché, as the case may be.

For producing composite sheet material

[Price 1/-]

Price 4s 6d

of the character referred to, a layer or layers of rubber in a raw or crude and vulcanizable condition with a layer or layers of wood, previously moistened with liquid for instance water or oil, with or without the layer of paper or papier mâché, as the case may be, may be placed in a vulcanizing press or pan and the rubber vulcanized at a suitable temperature, say for instance about 245° F., under considerable pressure, say for instance one ton to the square inch, for a short time, say for example for twenty or thirty minutes, the resulting composite sheet material, after being removed from the press or pan, being immersed for a short time in liquid, for instance water or oil, and then removed. If the material should then be found not to be flat, it can be replaced in the heated press for two or three minutes to evaporate the liquid and allow the wood to assume its normal condition.

Composite sheet material thus produced is waterproof, has the power of absorbing sounds, shocks and vibrations and can, if necessary, be bent to a considerable degree of curvature, or to a considerable angle, without liability of cracking. To ensure this result, in the case of thick material, the material should be moistened.

The outer surface of the layer of wood that will be exposed to view when the composite sheet material is fixed in position for use, can be varnished, stained, painted, decorated or otherwise treated to suit requirement.

The composite material before being vulcanized under pressure may if desired be provided on the side that is to be exposed to view, that is to say, the outer side, with inlaid material. For this purpose the inlaying material for instance ornamental wood veneer, may be cut to shape, then placed on the layer of wood forming the outer side of the composite sheet material, previously coated with vulcanizable solution, the said outer layer of material then cut through around the piece of inlaying material and the whole put into the vulcanizing press and subjected to the vulcanizing treatment under pressure, the inlaying material being thereby pressed inward so as to bring its outer surface flush with that of the surrounding surface of the outer layer of wood. The portion of the outer layer of wood below the inlaying material will be pressed into the layer of rubber.

Instead of vulcanizing the rubber under pressure by a hot process, as hereinbefore referred to, it may be vulcanized, with or without mechanical pressure, by the cold process, with the aid of suitable vulcanizing agents as well understood.

The rubber may be coloured with any suitable coloring agent to suit the colour of the wood used, so that it shall not, by diffusion through the pores of the wood, injuriously affect the appearance of the wood.

Dated this 24th day of May, 1923.  
For the Applicant,  
LLOYD WISE & Co.,  
10, New Court, Lincoln's Inn, London,  
W.C. 2,  
Chartered Patent Agents.

### PROVISIONAL SPECIFICATION

No. 22,393, A.D. 1923.

#### Improvements in or relating to the Manufacture of Composite Sheet Material.

I, CHARLES RICHARD COLLYER, of 423, Fulham Road, Chelsea, in the County of London, a British subject, do hereby declare the nature of this invention to be as follows:—

In the Specification of another Application for Letters Patent dated 24th May 1923, No. 13,778, I have described the production of composite sheet material comprising a layer of waterproof material, as for instance vulcanizable rubber, or rubber compositions or rubber substitutes, with or without addition of vegetable, animal or mineral fibrous material (all hereinafter included for brevity in the term rubber) faced on one or each side with a layer of wood firmly united with the layer of rubber.

I have now found that the layer of waterproof material may for some purposes advantageously be provided on one or each side with a layer of material other than wood, firmly united therewith, as for example by vulcanizing. Thus, for use as covering material for forming or covering walls or floors, a layer of rubber may be provided on one side with a layer of fireproof non-inflammable material consisting for instance of asbestos, or of an asbestos mixture or base. For this purpose, there may conveniently be used known non-inflammable sheet material composed largely of asbestos and sold under various trade names such as uralite, poillite and so forth. Or in lieu of a layer of asbestos

material (all hereinafter included for brevity in the term rubber) faced on one or each side with a layer of wood and having, it may be, one or more layers of supplementary material, the layers of wood and rubber, and also the layer or layers of supplementary material, if used, being firmly united together.

The layers of rubber and wood can be of various thickness and degrees of rigidity to suit requirement. For many purposes the thickness and degree of rigidity of the layers of rubber and wood may advantageously be such that the resulting composite sheet material is of a flexible nature so that it can readily be bent to enable it to be applied to the curved or angular surfaces of different bodies. In this case, the composite sheet material may advantageously consist of a thin layer of rubber and a thin layer of wood or veneer applied to one or to each surface of the layer of rubber, the composite material in the latter case forming three-ply flexible material.

When composite sheet material of a more rigid nature is required, the layer of rubber may be thicker, or the layer or layers of wood, particularly the layer of wood that is to form the backing of the composite material, may be made sufficiently thick to impart the desired rigidity to the composite material. Or the layers of rubber and wood may each be made sufficiently thick to suit requirement. Or sheet material of a more rigid character, for instance perforated sheet metal, metal gauze or wire, may be embodied in the composite material. For some purposes, the composite sheet material may consist of two or more layers of rubber with interposed and outer layers of wood to suit.

When a mixture of rubber and fibrous material is used to form what is herein called the layer or layers of rubber, the fibrous material may advantageously be kapok. Such composite material may advantageously be made in the manner described in the Specification of my Letters Patent No. 196,095 and be combined with the layer or layers of wood as hereinbefore described.

The layer of rubber may in some cases have a backing of paper or papier mâché backed by layers of rubber and wood, the paper or papier-mâché forming a centreing.

In some cases the layer of rubber may consist of a coating of a vulcanisable solution of rubber applied to one side of the layer, or each layer, of wood, and of the paper or papier-mâché, if this be used.

For producing composite sheet material

of the character referred to, a layer or layers of rubber in a raw or crude and vulcanisable condition with a layer or layers of wood, which in some cases, may be previously moistened with liquid, for instance water or oil, with or without the layer or layers of paper or papier-mâché, as the case may be, may be placed in a vulcanising press or pan and the rubber vulcanised at a suitable temperature, say for instance about 270 to 295° F., under pressure, say for instance about two hundred and fifty pounds to the square inch, for a short time, say for example for from about five to twenty minutes, according to the temperature of the steam used. The resulting composite sheet material, after being removed from the press or pan, may at once be immersed for a short time in liquid, for instance water or oil to prevent the wood cracking on cooling. If the material should be found not to be flat, it can be replaced in the heated press for two or three minutes to cause the wood to assume its normal flat condition.

Composite sheet material thus produced is waterproof, has the power of absorbing sounds, shocks and vibrations, and can, if necessary, be bent to a considerable degree of curvature, or to a considerable angle, without liability of cracking. To ensure this result, in the case of thick material, the material should be moistened before bending it.

The outer surface of the layer of wood that will be exposed to view when the composite sheet material is fixed in position for use, can be varnished, stained, painted, decorated or otherwise treated to suit requirement.

The composite material before being vulcanised under pressure, may, if desired, be provided on the side that is to be exposed to view, that is to say, the outer side, with inlaid material. For this purpose the inlaying material for instance ornamental wood veneer, may be cut to shape, then placed on the layer of wood forming the outer side of the composite sheet material, previously coated with vulcanisable solution and the whole put into the vulcanising press and subjected to the vulcanising treatment under pressure, the inlaying material being thereby pressed inward so as to bring its outer surface flush with that of the surrounding surface of the outer layer of wood. The portion of the outer layer of wood below the inlaying material will be pressed into the layer of rubber.

Instead of vulcanizing the rubber under pressure by a hot process, as hereinbefore referred to, it may be vulcanized with or without mechanical pressure, by the cold

process, with the aid of suitable vulcanizing agents as well understood.

The rubber may be coloured with any suitable colouring agent to suit the colour of the wood used, so that it shall not, by diffusion through the pores of the wood, injuriously affect the appearance of the wood.

The layer of rubber may, for some purposes, advantageously be provided on one side or on each side that is to say between the rubber & the outer layer of wood, with a layer of material other than wood, firmly united therewith, as for example by vulcanizing. Thus, for use as covering material for forming or covering walls or floors, a layer of rubber may be provided on one side with a layer of non-inflammable fireproof material consisting for instance of asbestos, or of an asbestos mixture or base. For this purpose, there may conveniently be used known non-inflammable sheet material composed largely of asbestos and sold under various trade names such as uralite, poilite and so forth. Or in lieu of a layer of asbestos or like material, a layer of papier-mâché, mill-board, pasteboard or the like may be used. Or, in some cases, the layer of rubber having at one side a layer of wood may be provided on its opposite side with sheet or plate metal, or with a layer of cement, concrete or like material. The said sheet material may be of varying thicknesses to suit requirement.

For uniting a layer of rubber to material of the kind referred to, the surface of such material may be first coated with a vulcanizable rubber solution, the layer of rubber applied to the coated surface and the whole vulcanized in any suitable way, care being first taken that when the layer of material is of asbestos, papier-mâché, millboard, or the like, liable to contain moisture, that it is thoroughly dry before it is subjected, with the layer of rubber, to the vulcanizing treatment. A layer of wood, in one or more pieces, may form the front face of the composite sheet material, the layer of asbestos, asbestos mixture, papier mâché, mill board or other material, applied to the other side of the sheet material then forming a backing or support.

When a layer of rubber is to form the face of the composite sheet material, the rubber compound of which it is formed may be treated in any known or suitable way so that it will finally have a variegated or ornamental surface.

To enable the vulcanizing process to be carried out at a comparatively low temperature, such as will not be liable to injure or impair the quality of wood

veneer, or other material used, an accelerator, as for instance aniline oil, or a formaldehyde preparation, that will lower the vulcanizing temperature, may be incorporated in the rubber or rubber solution before carrying out the vulcanizing treatment.

The layer or layers of rubber, may in some cases advantageously be of the composite character described in the Specification of former Letters Patent No. 196,095 granted to me.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Composite sheet material comprising one or more layers of rubber of any of the kinds herein referred to and termed for brevity rubber, and one or more layers of wood, with, it may be, one or more layers of supplementary material, one side, or each side of the composite material being of wood, the several layers being firmly united together, substantially as described.

2. Composite material according to Claim 1, comprising two layers of wood and an interposed layer of rubber firmly united together, substantially as described.

3. Composite sheet material according to Claim 1, comprising a thin layer of wood or veneer and a thin layer of rubber, firmly united together to form composite sheet material of a flexible nature, substantially as described.

4. Composite sheet material according to Claim 1, comprising two thin layers of wood or veneer and an interposed layer of rubber firmly united together to form three-ply flexible material, substantially as described.

5. Composite sheet material according to any of the preceding claims, wherein one side of such material is formed of wood of different kinds, substantially as described.

6. Composite sheet material according to any of the preceding claims, wherein one side of the sheet material comprises wood of one kind inlaid in wood of another kind, substantially as described.

7. Composite sheet material according to Claim 1, wherein the supplementary layer or layers of material is or are formed of papier-mâché, mill-board, pasteboard or the like, substantially as described.

8. Composite material according to Claim 1, wherein the supplementary layer or layers of material is or are formed of non-inflammable fireproof material, as for instance asbestos, or an asbestos mixture or base, substantially as described.

9. Composite sheet material according to Claim 1, comprising a number of alternately arranged layers of rubber, wood and asbestos or like material, or rubber, wood and papier-mâché, mill-board or like material, firmly united together, one or each side of the composite sheet material being faced with wood, substantially as described.

10. Composite material according to Claim 1, comprising one or more layers of rubber, one or more layers of wood, and one or more layers of material such as asbestos or asbestos mixture or base, or papier-mâché, mill-board or the like, a layer of wood in one or more pieces forming the front face of the composite sheet material and a layer of asbestos, asbestos mixture, papier-mâché, mill-board or like material forming the opposite or rear side of the composite sheet material, substantially as described.

11. Composite sheet material according to Claim 1, wherein a layer of rubber forms one side of such sheet material and such layer is provided with a variegated or ornamental surface, substantially as described.

12. Composite material according to Claim 1, wherein the layers of water-proof material and wood are provided with a layer of sheet or plate metal, or with a layer of cement, concrete or like material, substantially as described.

13. Composite sheet material according to any of the preceding claims, wherein the layers of water-proof and other material or materials are firmly united together by a vulcanising medium, substantially as described.

14. The manufacture of composite sheet material composed of rubber and wood, according to any of the preceding claims, with or without paper, papier-mâché, mill-board or the like, or asbestos or asbestos mixture or base, metal,

cement, concrete or like material, by using one or more layers of rubber in a raw or vulcanisable condition, with one or more layers of wood previously moistened with liquid, with or without one or more layers of paper, papier-mâché, mill-board or the like, or asbestos, asbestos mixture or base, a metal or cement, concrete or the like, vulcanising the assembled layers of material at a suitable temperature and under considerable pressure, in a press, removing the vulcanised product from the vulcanising press and immersing it for a short time in liquid, the product, if not flat, being replaced in the press for a short time to evaporate liquid present and enable the wood to assume its normal condition, substantially as described.

15. In the manufacture of composite sheet material of the kind herein described and claimed, protecting the outer layer or layers of wood and other material liable to be injuriously affected by heat, during the vulcanising treatment, by a separate covering layer or layers of material, as for instance, asbestos, substantially as described.

16. In the manufacture of composite sheet material of the kind herein described and claimed, incorporating in the raw rubber, or rubber solution, used for uniting the layers of material, an accelerator that will lower the vulcanising temperature, substantially as described for the purpose set forth.

17. The manufacture of composite sheet material of the kind hereinbefore referred to, substantially in the manner hereinbefore described.

Dated this 25th day of February, 1924.

For the Applicant,

LLOYD WISE & Co.,  
10, New Court, Lincoln's Inn, London, W.C. 2,  
Chartered Patent Agents.